REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	30 October 1996	Final Report: 1 Sep 93 - 31 Aug 96

4. TITLE AND SUBTITLE

AASERT93/Real-Time Control of Reasoning

5. FUNDING NUMBERS

G: F49620-93-I-0572

PR/TA: 3484/ZS

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10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Program Manager:
Dr. Abraham Waksman

12a. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited

13. ABSTRACT *(Maximum 200 words)*

This AASERT award supported students working on the development of next-generation planning and scheduling systems. Students supported by the award contributed directly to both the development and implementation of these systems. The dissertations completed involved the theoretical investigation of reason maintenance and dynamic backtracking and their practical impact on search engines, and the development of a new search technique known as "limited discrepancy search" that has been successfully implemented at a variety of external sites. Limited discrepancy search has also been incorporated in a CIRL-developed tool that develops manufacturing schedules, and the technique has produced the best known solution on realistic problems related to aircraft manufacture. Another AASERT-supported student interfaced the scheduling tool to Microsoft Project, demonstrating both the flexibility of the method and its applicability to a wide range of problems.

The parent AFOSR award involved planning research as well, and two of the five supported students have worked on problems fundamental to the development of more effective automated planning systems. This has included the development of specialized planning tools for simplified domains and an investigation of the reasons that these systems are effective, and a formal investigation of the role of causality in representations of commonsense knowledge about actions, and the impact such representations will have on planning systems.

14. SUBJECT TERMS			15. NUMBER OF PAGES: 3
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT: UNCL	18. SECURITY CLASSIFICATION OF THIS PAGE: UNCL	19. SECURITY CLASSIFICATION OF ABSTRACT: UNCL	20. LIMITATION OF ABSTRACT: UL

AASERT93/ REAL-TIME CONTROL OF REASONING

Final Technical Report

Grant number: F49620-93-I-0572

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October 30, 1996

Summary

Technical Progress:

This AASERT award supported students working on the development of next-generation planning and scheduling systems. Students supported by the award contributed directly to both the development and implementation of these systems. The dissertations completed involved the theoretical investigation of reason maintenance and dynamic backtracking and their practical impact on search engines, and the development of a new search technique known as "limited discrepancy search" that has been successfully implemented at a variety of external sites. Limited discrepancy search has also been incorporated in a CIRL-developed tool that develops manufacturing schedules, and the technique has produced the best known solution on realistic problems related to aircraft manufacture. Another AASERT-supported student interfaced the scheduling tool to Microsoft Project, demonstrating both the flexibility of the method and its applicability to a wide range of problems.

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Dissertations completed:

1. Andrew Baker: Intelligent Backtracking on Constraint Satisfaction Problems: Experimental and Theoretical Results - University of Oregon, 1995

2. William Harvey: Nonsystematic Backtracking Search - Stanford University, 1995

Students supported and publications written:

1. Baker, Andrew 9/94 - 3/95

    a. The hazards of fancy backtracking. In Proceeding of the Twelfth National Conference on Artificial Intelligence, 1994

b. Experimental results on the application of satisfiability algorithms to scheduling problems (with J.M. Crawford). In Proceeding of the Twelfth National Conference on Artificial Intelligence, 1994

2. Conlin, Thomas 6/96 - 8/96

3. Harvey, William 10/94 - 2/95

a. Limited discrepancy search (with M.L. Ginsberg). In Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence (IJCAI-95), volume 1, pages 607-613, 1995

b. Search and job shop scheduling. CIRL Technical Report, University of Oregon, 1994

4. Massey, Barton 8/95 - 8/96

5. Turner, Hudson 5/96 - 7/96